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L2: Entry 2 of 2 File: USPT Jan 6, 1987

DOCUMENT-IDENTIFIER: US 4634533 A
TITLE: Method of converting brines to useful products

also get 4,822,500

BSPR:
This invention relates to a process for converting brines into useful products, and more particularly to converting saline waters such as oil and gas field brine wastes, seawater or effluent from a seawater desalination plant, or other inland saline waters into animal feed supplements, fertilizer, salt, purified brine and purfied water.

BSPR:
While evaporation as a means of recovering fresh water from these saline sources has been attempted, the presence in such brines of a large proportion of divalent metal chlorides such as calcium and magnesium chloride have greatly complicated recovery efforts. These metal chlorides are highly corrosive to process equipment surfaces and deposit hard to remove mineral scales. This scale deposition becomes an even greater problem when the brines are heated.

BSPR:
Some attempts have been made in the past to separate useful byproducts from brines or other industrial waste waters. For example, Miller, U.S. Pat. No. 3,374,081, teaches a method of precipitating minerals from saline waters using lignin compounds, proteinaceous compounds, and tannins. The saline waters are initially concentrated by evaporation and the resultant salt precipitate removed. Then an organic precipitating agent such as a lignin or tannin is added to form an organic fertilizer containing other inorganic minerals.

BSPR:
Baldassari, U.S. Pat. No. 4,069,033, teaches the extraction of fertilizer salts and organic substances from a variety of industrial waste waters including sugar mill, distillery, and fermentation wastes. Baldassari teaches the use of strong acids or bases to form precipitates from such waste waters which precipitates are taught to be useful as fertilizers. However, neither of these particular procedures is believed to have gained widespread use.

BSPR:
Accordingly, the need exists for a cost effective and environmentally acceptable method for the disposal of oil and gas field waste brines and other saline water sources.

BSPR:
The present invention provides for the recovery of valuable products such as animal feed supplements, fertilizers, magnesia, iron oxide, salt, purified brine, and purified water from saline water sources such as oil and gas field waste brines and seawater. These products are useful materials having economic value.

DEPR:
In accordance with the practice of the present invention, and with reference to the drawing FIGURE, a saline water source such as an oil field waste brine,

seawater, or other inland saline water is initially stored in a large pit, tank, or storage chamber 10. The pit, tank, or storage chamber 10 is preferably lined or otherwise formed to be substantially water tight. If an oil or gas field waste brine is used as the saline water source, it may be necessary to remove traces of oil which are present in the brine. Typically, there is approximately one-half pint of oil per barrel of brine as received from oil field operations. This oil removal is accomplished through the use of a surface skimmer 12 which collects oil floating on the surface of the brine and pumps it via line 14 and pump 16 to an oil storage tank 18.

DEPR:
To the reaction mixture, an alkaline agent is added to adjust the pH of the mixture to the range of 1.8 to 2.9. A metering pump and pH meter may be used to control the addition of alkaline agent. As the alkaline agent, either soda ash (Na.sub.2 CO.sub.3), caustic soda (NaOH), potassium hydroxide, or potassium carbonate are preferred. The addition of an alkaline agent causes the precipitation of a mixture of fertilizer salts including principally dicalcium phosphate (CaHPO.sub.4.2H.sub.2 O). Additionally, most trace impurities in the brine such as strontium, iron, aluminum, flourine, and the like, will also be precipitated at this stage as complex mineral salts. This is because other ions will react with the phosphoric acid at pH's lower than that which calcium will react. This first stage of precipitation may not be necessary where impurity levels in the brine are sufficiently low.

DEPR:
The remaining brine is now substantially free of all divalent metal cations. The brine is pumped from storage tank 74 by pump 76 to an optional evaporation system 78. It may be desirable to adjust the pH of the brine in storage tank 75 to minimize corrosion problems in the evaporation equipment, and this may be accomplished by further addition of an alkaline agent such as sodium hydroxide to the brine. The brine itself is a useful product which can be used as a raw material for chlor-alkali plants. Optionally, it may be evaporated to recover crystallized salt.

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Search Results - Record(s) 1 through 2 of 2 returned.

☐ 1. Document ID: US 5476142 A

L2: Entry 1 of 2 File: USPT Dec 19, 1995

US-PAT-NO: 5476142
DOCUMENT-IDENTIFIER: US 5476142 A

not related

TITLE: Flexible contaminant-resistant grout composition and method

DATE-ISSUED: December 19, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kajita; Laura	Palatine	IL		

US-CL-CURRENT: 166/294; 106/803, 166/292, 405/264, 405/267

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 4634533 A

L2: Entry 2 of 2 File: USPT Jan 6, 1987

US-PAT-NO: 4634533
DOCUMENT-IDENTIFIER: US 4634533 A

TITLE: Method of converting brines to useful products

DATE-ISSUED: January 6, 1987

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Somerville; Robert L.	Columbus	OH	43232	
Sweat; Samuel F.				
Sullivan; John L.	Columbus	OH	43232	

US-CL-CURRENT: 210/722; 210/724, 210/726, 210/737, 210/912, 210/915, 423/169, 423/311, 588/236, 588/242, 588/246, 588/248, 71/43

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw. Desc | Image

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Term	Documents
FERMENTATION.USPT.	23827
FERMENTATIONS.USPT.	2652
SALINE.USPT.	74469
SALINES.USPT.	162
"SODA ASH".USPT.	0
CORROSION.USPT.	122314
CORROSIONS.USPT.	304
("SODA ASH" AND FERMENTATION AND SALINE AND CORROSION).USPT.	2

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L2: Entry 1 of 2 File: USPT Dec 19, 1995

DOCUMENT-IDENTIFIER: US 5476142 A
TITLE: Flexible contaminant-resistant grout composition and method

BSPR:
Water-swellable or sodium bentonite clay, when used together with Portland cement, aids in reducing shrinkage of the cement or grout composition but, still, substantial shrinkage occurs, sometimes resulting in undesirable inter-aquifer transfer. Other problems encountered with the above-described prior art cement compositions include a high alkalinity which can alter geotech analyses that rely on accurate pH determination for detection of metal ion contamination; permeability of the cement or grout composition after setting because of the properties of the composition or because of cracking of the cement due to ground shifting; the expense of Portland cement; heating of the cement or grout during curing causing weakening of the well casing, particularly where polymeric casings are used; corrosion of the iron-containing well casings because of toxicity of the cement or grout composition, or due to inadequate filling, e.g., shrinkage or cracking of the composition within the annulus, resulting in contamination of the recovered fluid or inadequate well plugging; abrasiveness of the cement or grout on the mixing equipment; initial relatively high viscosity of the composition when mixed with water resulting in more difficulty in completely filling an annulus, with bridging sometimes occurring in the annulus causing inter-zone transfer of fluid and/or contamination; and a non-flexible set cement resulting in cracking upon ground shifting or shrinkage and fluid contamination. The compositions of the present invention solve or improve each of the deficiencies in the above-described prior art compositions.

DEPR:
In accordance with the preferred embodiment of the present invention, a dispersing agent is included with the water-soluble polymer to achieve more even and homogeneous impregnation of the polymer, upon solubilization, into the entire mass of the smectite clay(s) being treated. While the dispersing/thinning agent is not essential to achieve the advantages of the present invention, the thinning of a slurry enables the clay platelets to form a more compact sealant layer. The SAPP does not really help the polymer to impregnate the clay as much as the rewetting and extruding does. Rewetting and extruding the clay with polymer and the dispersing/thinning agent, e.g., SAPP, helps the end product since SAPP impregnated into the clay aids in thinning and better dispersing the clay after being impregnated into the clay with the polymer. The preferred dispersing/thinning agent is sodium acid pyrophosphate (SAPP). Other suitable dispersing agents include tetra sodium pyrophosphate; sodium meta phosphate; sodium tetra phosphate; tannic acid; sodium tannate; soda ash; caustic soda; calcium lignosulfonate; mined lignins and modified chrome lignosulfonates. The dispersing agent is included in the grout composition in an amount of 0% to about 15%, based on the dry weight of the water-insoluble solids in the composition, preferably about 1% to about 10% by weight of water-insoluble solids.

DEPR:
The exceptions to this characteristic were CMC samples, as shown in Tables VII and VIII. Both the "dry" and rehydrated CMC samples showed little to no difference in fluid loss values when dispersed in 1000 ppm CaCl.sub.2, versus DI water. Although these CMC samples may seem promising with respect to

calcium contamination resistance (as did the "ALCOMER 228" polymer), it may not be advisable to use CMC, guar gums, or any other natural organic derivative that will degrade with time, in a product that must remain stable in place for long periods of time, because aging causes CMC and guars to ferment. However, fermentation of additives can be prevented by adding a biocide, e.g., together with the polymer, to inhibit bacterial growth.

DEPR:
Special attention should then be exercised to see if the samples could either recover from such ruptures and re-establish its sealant qualities as well as and maintain its contaminant resistance. Although the sea water permeants penetrated Grout D and the 20% polymer-impregnated sodium bentonite fines grout composition, within the first two days of testing, there was not a significant increase in the filtrate values or flow rates. In fact, on the third day of the test, Grout D experienced a noticeable increase in filtrate values for about 1 hour, and then subsequently the values decreased and stabilized. It appears that the grout sample had an irregularity or rupture in the cake layer, but was able to "heal" itself and recover. Although testing is not completed, the results so far indicate that the three grout samples were able to resist degradation from the saline permeants and able to either maintain adequate sealant characteristics with the presence of numerous voids and/or recover from occurring disturbances in the sample layer cake.

DEPR:
Preliminary results with sea water as the permeant indicate that both grouts produce permeabilities similar to the grout columns with tap water as their permeants. This indicates that these grout formulas are currently able to withstand degradation from the sea water. This is a vast improvement over some prior art bentonite grout products which have failed in the rigid wall columns in a shorter time span and with less severe permeants. The data collected suggest that the polymer-impregnated sodium bentonite fines-containing grout formulations appear to be highly contaminant resistant to severely saline permeants.

CLPR:
20. In the improved method of claim 19, wherein the dispersing agent is selected from the group consisting of sodium acid pyrophosphate; tetra sodium acid pyrophosphate; sodium meta phosphate; sodium tetra phosphate; tannic acid; sodium tannate; soda ash; caustic soda; calcium lignosulfonate; lignin; chrome lignosulfonate; and mixtures thereof.

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Search Results - Record(s) 1 through 5 of 5 returned.

☐ 1. Document ID: US 5998182 A

L4: Entry 1 of 5 File: USPT Dec 7, 1999

US-PAT-NO: 5998182
DOCUMENT-IDENTIFIER: US 5998182 A

TITLE: Deterioration inhibitor for emulsion-type processing oil and method for inhibiting deterioration of emulsion-type processing oil using the same

DATE-ISSUED: December 7, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nagahara; Hironari	Higashi-Hiroshima			JPX
Yamasaki; Hisao	Hiroshima			JPX
Miyama; Takashi	Kashiwa			JPX
Ito; Nobuhiro	Yamanashi-ken			JPX

US-CL-CURRENT: 435/170; 424/114, 424/115, 424/93.4, 435/244, 435/252.1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 2. Document ID: US 5683916 A

L4: Entry 2 of 5 File: USPT Nov 4, 1997

US-PAT-NO: 5683916
DOCUMENT-IDENTIFIER: US 5683916 A

TITLE: Membrane affinity apparatus and purification methods related thereto

DATE-ISSUED: November 4, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Goffe; Randal A.	Medway	MA		
Zale; Stephen E.	Marlborough	MA		
O'Connor; James L.	Chelmsford	MA		
Kessler; Stephen B.	Princeton	MA		

US-CL-CURRENT: 436/535; 210/198.3, 210/500.21, 210/500.23, 210/500.41, 210/638, 210/656, 435/180, 435/181, 435/182, 435/287.1, 435/287.2, 435/288.1, 435/6, 436/161, 436/178, 436/518, 436/531, 436/532, 530/413, 530/417

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw Desc | Image

☐ 3. Document ID: US 5652135 A

L4: Entry 3 of 5 File: USPT Jul 29, 1997

US-PAT-NO: 5652135
DOCUMENT-IDENTIFIER: US 5652135 A

TITLE: Strains of bacillus and aerococcus as deterioration inhibitor for emulsion-type processing oil

DATE-ISSUED: July 29, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Nagahara; Hironari	Higashi-Hiroshima			JPX
Yamasaki; Hisao	Hiroshima			JPX
Miyama; Takashi	Kashiwa			JPX
Ito; Nobuhiro	Kita-koma-gun			JPX

US-CL-CURRENT: 435/252.1; 435/244, 435/252.5

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

☐ 4. Document ID: US 5030629 A

L4: Entry 4 of 5 File: USPT Jul 9, 1991

US-PAT-NO: 5030629
DOCUMENT-IDENTIFIER: US 5030629 A

TITLE: Compositions and method comprising heterocyclic compounds containing two heteroatoms as membrane penetration enhancers

DATE-ISSUED: July 9, 1991

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Rajadhyaksha; Vithal J.	Mission Viejo	CA	92691	

US-CL-CURRENT: 514/211.07; 514/228.8, 514/256, 514/275, 514/356, 514/374, 514/376, 514/377, 514/385, 514/392, 514/423, 514/470, 514/652, 514/772, 514/788, 514/946, 514/947

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

☐ 5. Document ID: US 4822500 A

L4: Entry 5 of 5 File: USPT Apr 18, 1989

US-PAT-NO: 4822500
DOCUMENT-IDENTIFIER: US 4822500 A

TITLE: Saturated brine well treating fluids and additives therefore

DATE-ISSUED: April 18, 1989

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Dobson, Jr.; James W.	Houston	TX		
Mondshine; Alan T.	Houston	TX		
Mondshine; Thomas C.	Houston	TX		

US-CL-CURRENT: 507/212; 507/110, 507/111, 507/213, 507/903, 507/925

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw. Desc | Image

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Term	Documents
FERMENTATION.USPT.	23827
FERMENTATIONS.USPT.	2652
SALINE.USPT.	74469
SALINES.USPT.	162
"SODIUM BICARBONATE".USPT.	0
CORROSION.USPT.	122314
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Search Results - Record(s) 1 through 9 of 9 returned.

☐ 1. Document ID: US 6071735 A

L5: Entry 1 of 9 File: USPT Jun 6, 2000

US-PAT-NO: 6071735
DOCUMENT-IDENTIFIER: US 6071735 A

TITLE: Enzyme preparation with endoglucanase activity

DATE-ISSUED: June 6, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schulein; Martin	Copenhagen .O slashed.			DKX
Oxenb.o slashed.ll; Karen Margrethe	Charlottenlund			DKX
Andersen; Lene Nonboe	Birker.o slashed.d			DKX
Lassen; S.o slashed.ren Flensted	Copenhagen .O slashed.			DKX
Kauppinen; Markus Sakari	Copenhagen N			DKX
Nielsen; Jack Bech	Hellerup			DKX

US-CL-CURRENT: 435/209; 435/264, 435/278, 8/400

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

☐ 2. Document ID: US 6001639 A

L5: Entry 2 of 9 File: USPT Dec 14, 1999

US-PAT-NO: 6001639
DOCUMENT-IDENTIFIER: US 6001639 A

TITLE: Endoglucanases

DATE-ISSUED: December 14, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schulein; Martin	Copenhagen			DKX
Andersen; Lene Nonboe	Aller.o slashed.d			DKX
Lassen; S.o slashed.ren Flensted	Copenhagen			DKX
Kauppinen; Markus Sakari	Copenhagen			DKX
Lange; Lene	Valby			DKX
Nielsen; Ruby Iium	Farum			DKX
Ihara; Michiko	Chiba			JPX
Takagi; Shinobu	Chiba			JPX

US-CL-CURRENT: 435/263; 435/209, 435/277, 510/320, 510/321

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☐ 3. Document ID: US 5919691 A

L5: Entry 3 of 9 File: USPT Jul 6, 1999

US-PAT-NO: 5919691
DOCUMENT-IDENTIFIER: US 5919691 A

TITLE: Enzyme and enzyme preparation with endoglucanase activity

DATE-ISSUED: July 6, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schulein; Martin	Copenhagen .O slashed.			DKX
Oxenb.o slashed.ll; Karen Margrethe	Charlottenlund			DKX
Andersen; Lene Nonboe	Birker.o slashed.d			DKX
Lassen; S.o slashed.ren Flensted	Copenhagen .O slashed.			DKX
Kauppinen; Markus Sakari	Copenhagen N			DKX
Nielsen; Jack Bech	Hellerup			DKX

US-CL-CURRENT: 435/209; 435/255.2, 435/256.1, 435/256.7, 435/320.1, 536/23.2

Full | Title | Citation | Front | Review | Classification | Date | Reference KWIC | Draw Desc | Image

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☐ 4. Document ID: US 5912157 A

L5: Entry 4 of 9 File: USPT Jun 15, 1999

US-PAT-NO: 5912157
DOCUMENT-IDENTIFIER: US 5912157 A

TITLE: Alkaline cellulases

DATE-ISSUED: June 15, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
von der Osten; Claus	Lyngby			DKX
Schulein; Martin	K.o slashed.benhavn .O slashed.			DKX

US-CL-CURRENT: 435/209; 435/267, 510/320

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 5. Document ID: US 5472732 A

L5: Entry 5 of 9 File: USPT Dec 5, 1995

US-PAT-NO: 5472732
DOCUMENT-IDENTIFIER: US 5472732 A

TITLE: Indigestible dextrin

DATE-ISSUED: December 5, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ohkuma; Kazuhiro	Sanda			JPX
Hanno; Yoshio	Itami			JPX
Inada; Kazuyuki	Takarazuka			JPX
Matsuda; Isao	Itami			JPX
Katta; Yasuo	Hyogo			JPX

US-CL-CURRENT: 426/658; 426/549, 426/646

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 6. Document ID: US 5429766 A

L5: Entry 6 of 9 File: USPT Jul 4, 1995

US-PAT-NO: 5429766
DOCUMENT-IDENTIFIER: US 5429766 A

TITLE: Detergent composition containing alkaline pullylanase enzyme

DATE-ISSUED: July 4, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sone; Taeko	Utsunomiya			JPX
Tosaka; Masaki	Utsunomiya			JPX
Saeki; Katsuhisa	Kawachi			JPX
Ara; Katsutoshi	Utsunomiya			JPX
Deguchi; Katsuhiko	Utsunomiya			JPX
Igarashi; Kazuaki	Ichikaimachi			JPX

US-CL-CURRENT: 510/392; 435/210, 435/832, 510/226, 510/320, 510/323

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 7. Document ID: US 5364652 A

L5: Entry 7 of 9 File: USPT Nov 15, 1994

US-PAT-NO: 5364652
DOCUMENT-IDENTIFIER: US 5364652 A

TITLE: Indigestable dextrin

DATE-ISSUED: November 15, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ohkuma; Kazuhiro	Sanda			JPX
Hanno; Yoshio	Itami			JPX
Inada; Kazuyuki	Takarazuka			JPX
Matsuda; Isao	Itami			JPX
Katta; Yasuo	Hyogo			JPX

US-CL-CURRENT: 426/549; 426/590, 426/658

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 8. Document ID: US 5316691 A

L5: Entry 8 of 9 File: USPT May 31, 1994

US-PAT-NO: 5316691
DOCUMENT-IDENTIFIER: US 5316691 A

TITLE: Detergent composition containing an alkaline pullulanase from bacillus ferm BP-3048

DATE-ISSUED: May 31, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sone; Taeko	Tochigi			JPX
Tosaka; Masaki	Tochigi			JPX
Saeki; Katsuhisa	Tochigi			JPX
Ara; Katsutoshi	Tochigi			JPX
Deguchi; Katsuhiko	Tochigi			JPX
Igarashi; Kazuaki	Tochigi			JPX

US-CL-CURRENT: 510/392; 435/210, 510/226, 510/320, 510/323, 510/374

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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☐ 9. Document ID: US 4822500 A

L5: Entry 9 of 9 File: USPT Apr 18, 1989

US-PAT-NO: 4822500
DOCUMENT-IDENTIFIER: US 4822500 A

TITLE: Saturated brine well treating fluids and additives therefore

DATE-ISSUED: April 18, 1989

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Dobson, Jr.; James W.	Houston	TX		
Mondshine; Alan T.	Houston	TX		
Mondshine; Thomas C.	Houston	TX		

US-CL-CURRENT: 507/212; 507/110, 507/111, 507/213, 507/903, 507/925

Full | Title | Citation | Front | Review | Classification | Date | Reference | KWIC | Draw Desc | Image

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Refine Search: `"fermentation" and "saline" and "sodium sulfate" and "corrosion"` Clear

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DB Name	Query	Hit Count	Set Name
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USPT	"fermentation" and "saline" and "sodium bicarbonate" and "corrosion"	5	L4
USPT	"fermentation" and "saline" and " sodium carbonate" and "corrosion"	11	L3
USPT	"fermentation" and "saline" and "soda ash" and "corrosion"	2	L2
USPT	"fermentation" and "saline" and "soda ash"	23	L1

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Term	Documents
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Refine Search: `l6 and "corrosion"` Clear

Search History

Today's Date: 10/17/2001

DB Name	Query	Hit Count	Set Name
USPT	l6 and "corrosion"	0	L7
USPT	4162324.pn.	1	L6
USPT	"fermentation" and "saline" and "sodium sulfate" and "corrosion"	9	L5
USPT	"fermentation" and "saline" and "sodium bicarbonate" and "corrosion"	5	L4
USPT	"fermentation" and "saline" and " sodium carbonate" and "corrosion"	11	L3
USPT	"fermentation" and "saline" and "soda ash" and "corrosion"	2	L2
USPT	"fermentation" and "saline" and "soda ash"	23	L1